Mushrooms of Kerala

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Contents

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1

INTRODUCTION

Mushrooms are fungi, distinguished by their epigeous and hypogeous macroscopic fruiting bodies. However, the term ' mushroom' is generally used to denote the edible fleshy fungi; the poisonous ones are called toadstools. Most mushrooms belong to the Phyla Basidiomycota and Ascomycota and their fruiting bodies vary much in shape, size, colour, texture, odour and taste. Mushrooms are familiar to everyone. They are known to be edible from time immemorial. Their utilization as food is closely related on the history of mankind. Edible, poisonous and hallucinogenic properties of mushrooms were known to many of the ancient civilizations. Mushrooms are also important component of the forest ecosystems and play a major role in ecosystem dynamics, such as litter decomposition, nutrient cycling and nutrient transport. Most of the mushrooms are saprobes and occur on soil, humus, decaying wood, litter, dung, among others. The saprophytic members constitute major recyclers of nutrients. They are known to break down the lignocelluloses and thus help in litter degradation, converting large molecular complexes into simpler compounds. The activities of these mushrooms aid in return of carbon, hydrogen, nitrogen and minerals back into the ecosystem to be utilized by plants and other organisms.

Many mushrooms are ectomycorrhizal members having mutualistic association with roots of trees and shrubs belonging to both angiosperms and gymnosperms. The mutualistic association helps in the uptake of poorly mobile nutrients including nitrogen and phosphorus by plants in the nutrient deficient or problematic soils. Thus, the ectomycorrhizal mushrooms play a vital role in nutrient transport as well as maintaining the health and vitality of planted and natural stands. Species of *Amanita, Boletus, Russula, Laccaria, Lactarius, Inocybe, Pisolithus, Scleroderma*, among others, are important ectomycorrhizal partners. A few mushrooms like *Termitomyces* also form mutualistic relationship with termites belonging to Macrotermitinae and grow from the termite nests or mounts. Some are also pathogens of woody plants, insects and higher fungi.

Fruiting bodies of mushrooms are formed only when ecological conditions are favourable, but their mycelia exist in soil, humus, plant litter, decaying wood or other substrata inconspicuously for a very long period. Mushrooms fruiting on woody substratum are usually either saprobes or pathogens causing root rot, butt rot, heart rot and decay of wood, branches and twigs. The wood rotting mushrooms belong to two groups: white rotters and brown rotters. The heart rot causing mushrooms affect the inner core or heartwood of trees and their fruiting bodies appear only at the advanced stage of decay.

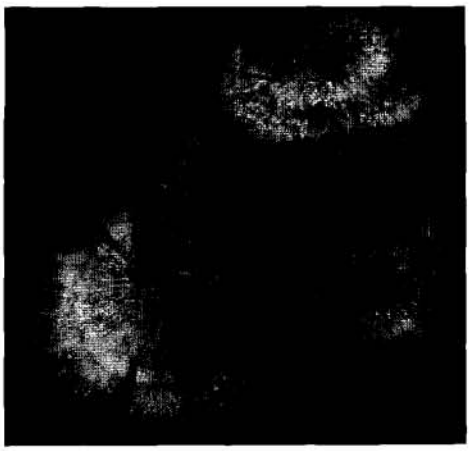
Many mushrooms are edible and also useful in production of a range of bioactive compounds including industrially important enzymes. The edible mushrooms are a natural resource with high nutritional and economic value. Recent studies confirm that wild collected edible mushroom species are important source of food and income in both developing and developed countries. More than 1200 species of mushrooms are used in 85 different countries for their gastronomic and/or medicinal properties. China, Japan and eastern European countries are particularly enthusiastic collectors and consumers, and have developed a robust marketing network to satisfy the high demand. *Cantharellus cibarius, Boletus* spp., *Tricholoma matsutake, Tuber melanosporum* are the most remarkable mushroom species in terms of world trade. In India, the tradition of gathering and consuming mushrooms among rural population is on the decline because of the growing urbanization and associated changes in food habits. However, tribals and other forest dwellers are exploiting some of the edible and medicinal mushrooms.

Mushrooms are well known for their medicinal properties. Many of them are widely exploited in traditional and alternative medicines to heal a broad range of diseases. Amongst the many species used in medicine, the most common are *Cordyceps sinensis, Ganoderma lucidum, Lentinus edodes, Trametes versicolor,* especially esteemed in China and Japan. Mushrooms are a good source of digestible proteins and fibre in the form of chitin, which has potential in lowering cholesterol. The intake of mushrooms has also been shown to be effective in cancer prevention (Ikekawa, 2001). Several anti-tumor polysaccharides have been isolated from mushrooms like *Lentinus* spp., *Flammulina velutipes* (Salder, 2003). Antioxidant activity of mushrooms, *Phellinus rimosus, Pleurotus florida, Pleurotus sajor-caju, Ganoderma lucidum* has also been recorded (Lakshmi *et al.*, 2004).

So far, only a handful mushrooms are being cultivated and commercially exploited worldwide. Species of *Agaricus, Pleurotus, Calocybe, Macrocybe, Tricholoma, Volvariella, Auricularia,* among others, are cultivated on commercial scale in different countries. In India, *Agaricus bisporus* (button mushroom) *Pleurotus* spp. (oyster mushroom) and *Volvariella volvacea* (tropical mushroom or paddy straw mushroom) are under commercial cultivation. Of these, about 90 per cent of the total production (ca. 7000 tonnes/ annum) is contributed by the button mushroom alone.

Most mushrooms are widely distributed both in tropical and temperate regions, however, some of them are confined to particular ecological zones. Mushroom diversity, as with all other sub-sects of biodiversity exhibits distinct patterns in both space and time. Such fungal diversity patterns are to a large extent unexplored. Kerala State represents an epitome of the Western Ghats in many respects and the State is remarkably well known for luxuriant vegetation and rich biological diversity. The geographical separation of the State, bordered in the west by the Arabian Sea and the east by the Western Ghats and their peculiar physiographic, edaphic and climatic gradients have contributed significantly to the development of diverse types of ecosystems, each supporting unique assemblage of biological communities including mushrooms with an impressive array of species and genetic diversity.

forest litter. This species is usually found associated with bamboo clumps (*Bambusa bambos*). Mushroom fruit bodies are small sized. Mushroom cap 3-5.5 cm diam., convex expanding, slightly depressed at the disk; surface pale yellow, covered by a tomentum of erect, downy hairs disrupting into dark brown crowded squamules. Gills sinuato-adnate, yellow, narrow up to 2 mm wide, crowded, with lamellulae of two lengths; edge denticulate. Stipe 3-4 cm long and 4-7 mm thick, cylindric, hollow; surface yellow, paler at top, longitudinally striate, with faint zones of yellowish brown, fibrillose squamules.



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